

Claims

1.

A two-piece plastic closure that comprises:

a plastic closure shell including a base wall and a peripheral skirt with internal means for securing the closure over a container finish, and

a plastic disk loosely retained within said shell parallel to but separate from said base wall, and a resilient sealing liner molded in situ on said disk for sealing engagement with a container finish.

2.

The closure set forth in claim 1 wherein said disk includes an annular ring underlying said liner on a side of said disk remote from said base wall, said ring being spaced from said skirt for urging said liner against a radially inner edge of a container finish when said closure is secured to the container finish.

3.

The closure set forth in claim 2 wherein said disk comprises a flat base form while said annular ring extends.

4.

1 The closure set forth in claim 3 wherein said ring has an S-shaped radially
2 outwardly facing surface, including a rounded convex portion that extends from an axial edge
3 of said ring and a rounded concave portion that extends from said convex portion to a flat axially
4 facing surface of said base.

5.

1 The closure set forth in claim 4 wherein said disk base has a central portion within
2 said ring and a peripheral portion outside of said ring, said central and peripheral portions being
3 of identical thickness.

6.

1 The closure set forth in claim 5 wherein said liner is of uniform thickness over
2 said central portion, said ring and said peripheral portion of said disk.

7.

1 The closure set forth in claim 6 wherein said liner includes a barrier resin material
2 to resist migration of gases, water vapor or flavorants through said liner.

8.

1 The closure set forth in claim 5 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

9.

1 The closure set forth in claim 3 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of a container finish when said
4 closure is secured to the container finish.

10.

1 The closure set forth in claim 9 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

11.

1 The closure set forth in claim 10 wherein thickness of said liner on said radially
2 inwardly directed surface of said rib is less than the thickness of said liner on said disk base and
3 said ring.

12.

1 The closure set forth in claim 10 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

13.

1 The closure set forth in claim 1 wherein said closure shell includes a bead
2 extending radially inwardly from said skirt at a position spaced from said base wall, and wherein
3 said disk and liner are loosely captured between said bead and said base wall.

14.

1 The closure set forth in claim 13 wherein said closure shell further includes a
2 tamper-indicating band connected by frangible means to a lower edge of said skirt for abutment
3 with a stop on the container finish, spacing between said bead and said base wall being such that
4 said band abuts the stop and fractures said frangible means before said bead lifts said disk and
5 liner from sealing engagement with the container finish.

15.

1 The closure set forth in claim 1 wherein said liner includes a barrier material
2 against migration of gases, water vapor or flavorants through said liner.

16.

A plastic closure that comprises:

a plastic closure shell including a base wall, and a peripheral skirt with an internal thread for securing the closure to a container finish and an internal bead adjacent to but spaced from said base wall,

a plastic disk loosely retained by said bead parallel to but separate from said base wall, said disk including a flat base with a peripheral portion captured between said bead and said base wall and an annular ring extending axially from said base adjacent to but spaced from said periphery, and

a resilient liner molded onto said disk covering at least a central portion of said base and said ring, said ring urging said liner into sealing engagement with a radially inner edge of a container finish when said closure is secured to the container finish.

17.

The closure set forth in claim 16 wherein said liner is molded in situ onto said disk within said closure.

18.

The closure set forth in claim 17 wherein said ring has an S-shaped radially outwardly facing surface, including a rounded convex portion that extends from an axial edge of said ring and a rounded concave portion that extends from said convex portion to a flat axially facing surface of said base.

19.

1 The closure set forth in claim 18 wherein said liner includes a barrier resin
2 material to resist migration of gases, water vapor or flavorants through said liner.

20.

1 The closure set forth in claim 16 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

21.

1 The closure set forth in claim 16 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of a container finish when said
4 closure is secured to the container finish.

22.

1 The closure set forth in claim 21 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 inwardly outwardly from said base of said disk.

23.

1 The closure set forth in claim 22 wherein thickness of said liner on said radially
2 inwardly directed surface of said rib is less than the thickness of said liner on said disk base and
 said ring.

24.

1 The closure set forth in claim 22 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

25.

1 A plastic closure that comprises:

2 a plastic shell including a base wall and a peripheral skirt with internal means for
3 securement to a container finish,

4 a resilient sealing liner for urging by said base wall into sealing engagement with
5 a container finish upon securement of said skirt to the finish, and

6 an annular ring underlying said liner and spaced radially inwardly from said skirt
7 for urging said liner into sealing engagement with a radially inner edge of the container finish.

26.

1 The closure set forth in claim 25 wherein said ring is on said base wall.

27.

1 The closure set forth in claim 26 wherein said closure shell further includes a
2 shoulder that extends radially inwardly from said skirt adjacent to said base wall, said liner
3 extending along a radially inwardly directed surface of said shoulder for sealing engagement with
4 an outer edge of a container finish when the closure is secured to the container finish.

28.

1 The closure set forth in claim 27 wherein said radially inwardly directed surface
is a conical surface that is angled radially outwardly from said base wall.

29.

1 The closure set forth in claim 26 wherein said closure shell further includes an
2 annular wall that extends axially from said base wall adjacent to said skirt, said liner extending
3 along a radially inwardly directed surface of said annular wall for sealing engagement with an
4 outer edge of a container finish when said closure is secured to the container finish.

30.

1 The closure set forth in claim 29 wherein said radially inwardly directed surface
2 is a conical surface that is angled radially outwardly from said base wall.

31.

1 The closure set forth in claim 25 wherein said ring is on a plastic disk loosely
2 retained within said shell parallel to but separate from said base wall.

32.

1 The closure set forth in claim 31 wherein said disk comprises a flat base from
2 which said annular ring extends.

33.

1 The closure set forth in claim 32 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said liner.

34.

1 The closure set forth in claim 32 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of the container finish when said
4 closure is secured to the container finish.

35.

1 The closure set forth in claim 34 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

36.

1 The closure set forth in claim 35 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

37.

1 The closure set forth in claim 25 wherein said liner includes a barrier resin
 material to resist migration of gases, water vapor or flavorants through said liner.

38.

1 A closure and container package that comprises:
2 a container including a body and a finish with an external thread, and
3 a plastic closure that includes:
4 a plastic closure shell including a base wall, and a peripheral skirt with an internal
5 thread securing the closure to a said container finish and an internal bead adjacent to but spaced
6 from said base wall,
7 a plastic disk retained by said bead parallel to but separate from said base wall,
8 said disk including a flat base with a peripheral portion captured between said bead and said base
9 wall and an annular ring extending axially from said base adjacent to but spaced from said
10 periphery, and
11 a resilient liner molded onto said disk covering at least a central portion of said
12 base and said ring, said ring urging said liner into sealing engagement with a radially inner edge
13 of said container finish.

39.

1 The package set forth in claim 38 wherein said liner is molded in situ onto said
2 disk within said closure.

40.

1 The package set forth in claim 39 wherein said ring has an S-shaped radially
2 outwardly facing surface, including a rounded convex portion that extends from an axial edge
3 of said ring and a rounded concave portion that extends from said convex portion to a flat axially
facing surface of said base.

41.

1 The package set forth in claim 40 wherein said liner includes a barrier resin
2 material to resist migration of gases, water vapor or flavorants through said liner.

42.

1 The package set forth in claim 38 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

43.

1 The package set forth in claim 38 wherein said disk further includes an annular
2 rib around a radially outer edge of said disk base extending away from said base wall and
3 underlying said liner for engaging said liner against a radially outer edge of said container finish.

44.

1 The package set forth in claim 43 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

45.

1 The package set forth in claim 44 wherein thickness of said liner on said radially
2 inwardly directed surface of said rib is less than the thickness of said liner on said disk base and
3 said ring.

46.

1 The package set forth in claim 44 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
3 annular rib has a concave radially outwardly directed surface portion received over said bead.

47.

1 A method of making a two-piece plastic closure that comprises:

- 2 (a) providing a plastic closure shell that includes a base wall and a peripheral
3 skirt with internal means for securing the closure to a container finish,
4 (b) placing a plastic disk within said closure shell against said base wall, and
5 (c) compression molding a resilient plastic liner in situ onto said disk for sealing
6 engagement with a container finish.

48.

1 The method set forth in claim 47 wherein said step (a) includes providing an
2 internal bead around said skirt adjacent to but spaced from said base wall, and wherein said step
3 (b) includes placing said disk within said shell such that a periphery of said disk is loosely
4 captured between said bead and said base wall.

49.

1 The method set forth in claim 48 wherein said disk has a central portion adjacent
2 to said base wall.

50.

1 The method set forth in claim 49 wherein said step (c) comprises compression
2 molding a liner over said disk, including said central portion, which includes a barrier resin to
3 said migration of gases, water vapor or flavorants through said liner.

51.

1 The method set forth in claim 48 wherein said disk includes an annular ring
2 underlying said liner on a side of said disk remote from said base wall, said ring being spaced
3 from said skirt for urging said liner against a radially inner edge of a container finish when said
4 closure is secured to the container finish.

52.

1 The method set forth in claim 51 wherein said ring has an S-shaped radially
2 outwardly facing surface, including a rounded convex portion that extends from an axial edge
3 of said ring and a rounded concave portion that extends from said convex portion to a flat axially
4 facing surface of said base.

53.

1 The method set forth in claim 52 wherein said disk base has a central portion
2 within said ring and a peripheral portion outside of said ring, said central and peripheral portions
3 being of identical thickness.

54.

1 The method set forth in claim 53 wherein said liner is of uniform thickness over
2 said central portion, said ring and said peripheral portion of said disk.

55.

1 The method set forth in claim 53 wherein said disk further includes an axially
2 extending bead around a peripheral portion of said disk base to space said disk base from said
3 base wall of said shell.

56.

1 The method set forth in claim 51 wherein said disk further includes an annular rib
2 around a radially outer edge of said disk base extending away from said base wall and underlying
3 said liner for engaging said liner against a radially outer edge of the container finish when said
4 closure is secured to the container finish.

57.

1 The method set forth in claim 56 wherein said annular rib has a radially inwardly
2 directed surface, onto which a peripheral portion of said liner is molded, that extends axially and
3 radially outwardly from said base of said disk.

58.

1 The method set forth in claim 57 wherein said closure shell has a bead extending
2 radially inwardly from said skirt adjacent to but spaced from said base wall, and wherein said
annular rib has a concave radially outwardly directed surface portion received over said bead.